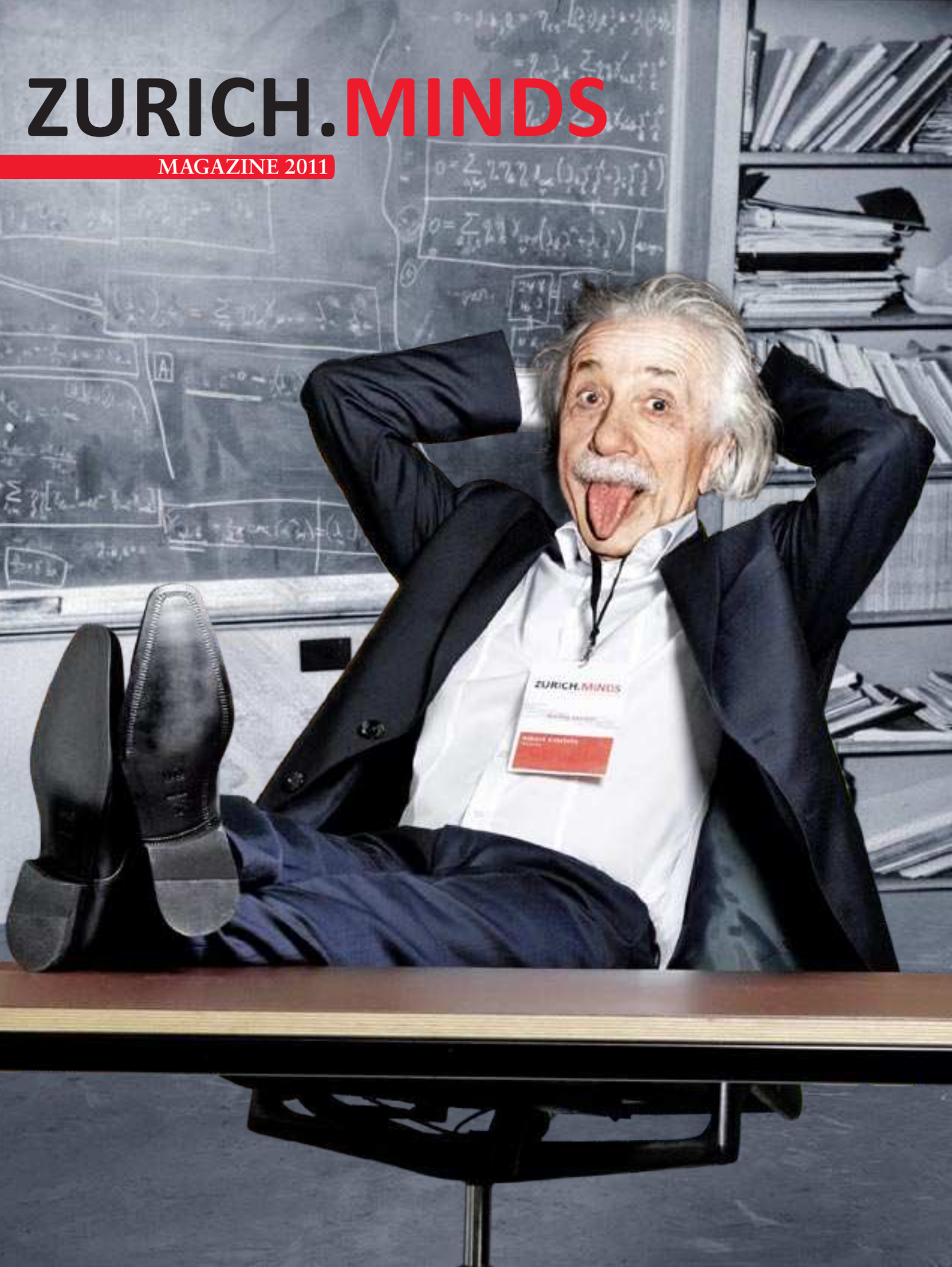
A True Renaissance Person

Patzke, Greta R ; Schattka, H ; Dobelli, R

ZURICH.MINDS

MAGAZINE 2011

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ZURICH.MI

Impressum

MARC WALDER
CEO Ringier
Switzerland & Germany
and Member of ZURICH.MINDS

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IMPRESSUM

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Péter Fankhauser's ballbot is fast, agile, highly technical and «actually quite cute.»

PHOTOS Karl-Heinz Hug, Geri Born **COVER** Geri Born, Adrian Bretscher **CLOTHES** outfit by Herren Globus Zurich, Löwenstrasse 37, 8021 Zurich

Editorial

ROLF DOBELLI
Novelist and entrepreneur
Founder & Chairman
ZURICH.MINDS

MAKING BETTER DECISIONS

We live in silos. We specialize. We tend to know more and more about less and less.

Four years ago, a group of friends got together and decided to do something about that. The result was ZURICH.MINDS.

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Today, ZURICH.MINDS is an invitation-only community of 300 high-caliber individuals who have made proven contributions in science, the arts and business. We strive for deep understanding. Our goal is to improve the quality of our decisions as private individuals, as role models and as citizens of this planet – and to inspire others to do the same.

So, there you have it: Unconstrained exchange of ideas. No political correctness. No ideology. No corporate small talk.

Year five is coming up, December 13, 2011. Save the date. Meanwhile, thanks to everybody who has supported us, whether with funding* or with incredible presentations.

This volume celebrates four glorious years of ZURICH.MINDS. We are grateful to Marc Walder who had the idea for this book and who sponsored it. Special thanks also go to Ringier's creative director André Frensch, to photographers Karl-Heinz Hug and Geri Born and to managing editor Haike Schattka.

Browse through the pages. Enjoy the portraits. Read, what journalist Michael Merz got out of meeting Hans Danuser in his portrait of this exceptional Swiss artist. Get to know all the other faces. Immerse yourself in our community. There is no substitute for ZURICH.MINDS.

Rolf Dobelli, Pascal Forster, Michael Hengartner, Thomas Ladner, Hans-Jürg Rufener, Alex Wassmer

ZURICH.MINDS FOUNDATION

* We depend on you to be able to keep ZURICH.MINDS thinking. All contributions are appreciated and entirely tax deductible. If you'd like to help out, please send an e-mail to: **rolf.dobelli@zurichminds.com**. Many thanks.

“LADIES AND GENTLEMEN, THIS IS REZERO”

“We really wanted this robot to dance!” explained **Péter Fankhauser** at the ZURICH.MINDS flagship event 2010 in Kaufleuten where he presented the ballbot Rezero, a robot gliding around on a ball.

COPY: **HAIKE SCHATTKA**
PHOTOS: **KARL-HEINZ HUG**

After the presentation, the ZURICH.MINDS attendants flock towards the stage with the twirling robot. A small crowd forms around the little tower of cables, batteries and computer components that is balancing on a ball. People delight in the high-tech robot of one meter height as if it were a droll animal. Rezero, the “ballbot,” is the result of a project that Péter Fankhauser, 23, carried out with 12 other students from the ETH and other institutions of higher education.

REZERO GLIDES across the small stage with ease. Just like a figure skater on ice, it moves in all directions, doing curves and spins. At one point, it looks as if it is going to topple over, but then it recovers and continues pirouetting as if nothing had happened. “He wants to demonstrate what he can do, as if he was saying, ‘Backwards, forwards. I can do it all. Look at me!’” For emphasis, Péter straightens up, imitating the proud movements as he describes them; and the pride is actually a little bit his own.

BEING ABLE TO PERFORM these movements differentiates Rezero from other ballbots. The earlier research on which Péter and his fellow students based their project focused mainly on stabilizing the robot on the ball. “Adding dynamics was definitely one of our goals,” Péter reports. The large team defined its objectives during an extensive brainstorming session at the very beginning of the eight-month project: “With this many people, it was crucial that everyone fully supports the project. For that reason, we wanted to make sure that everyone could contribute even their wildest ideas. We presented them all and discussed them.” They decided to develop a ballbot that could go fast in all directions, turn around and remain stable. And, indeed, Rezero can dash around with up to 3.5 m/sec and can tilt up to 17 degrees without toppling. Even if people push it, it won’t fall over.

AND YET, PÉTER AND HIS TEAMMATES handle the robot as gently as if it were a kid learning to ride a bike. “We just have that one; it is expensive and we still need it. It’s not that we are concerned. We simply know its weaknesses. We know what can break. The software has bugs; the mechanical system isn’t perfect.” When the students were optimizing the software and the mechanical system during the testing phase, they expected the robot to fall a lot. To avoid breakage, they built support structures that resembled mobile cloak hangers. They tied the robot to two of the supports, which team members then pushed around following the ballbot’s movements. Whenever the robot fell, it would be on the ropes. The instability of the early system is still on

CONTINUED: **10**

BEYOND THE LECTURE HALL
In the final year of their bachelor studies, ZURICH.MINDS Rookie Péter Fankhauser and his fellow students developed the ballbot.

TEAM BALLBOT
Not the Fabulous Four from Liverpool but the Savvy Scientifics from Zurich. From left: Péter Fankhauser, Michael Neunert, Lukas Limacher, Rezero, Jérôme Käser, Corsin Gwerder, Simon Dössegger.

**“COME TOGETHER RIGHT NOW.”
13 STUDENTS, 3 DISCIPLINES,
3 INSTITUTIONS – ONE BALLBOT.**

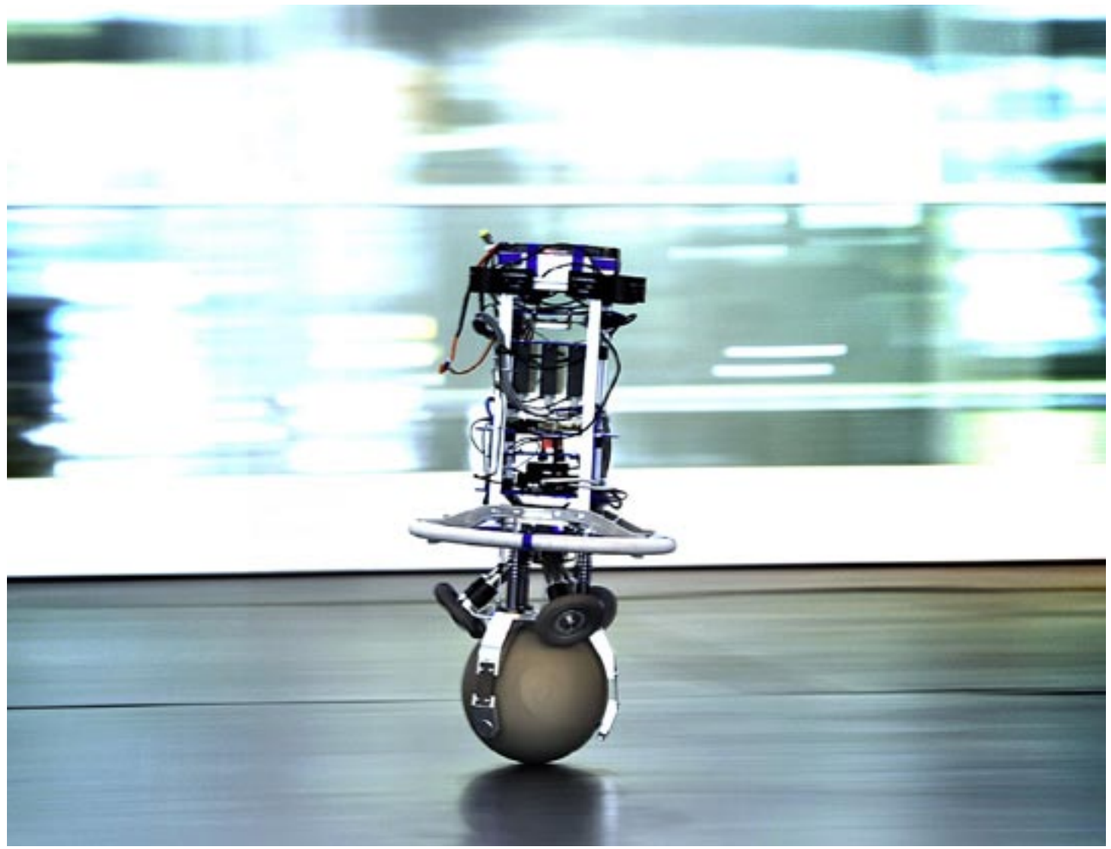
“WHEN HE WAS STANDING FOR THE FIRST TIME, HE WAS TREMBLING LIKE A LITTLE DEER.”

their minds: “When he was standing for the first time, he was trembling like a little deer. Of course, we always remember that as well.”

APART FROM THE OWNERS’ CAREFULNESS, the ballbot has a couple of features that will protect it from falling. A filter prevents it from being affected by overly aggressive joystick movements. If someone yanked the stick from one side to the other quickly, for example, the ballbot would become instable. Therefore it is programmed in a way that allows only input that its system can handle. Another method of self-protection is that the ballbot is more likely to roll away than to topple if someone pushes it hard.

AN “INERTIA MEASUREMENT UNIT,” like a digital level, measures the robot’s orientation in the room. One of its two computers gathers the information to calculate how to turn the motors so that the system remains stable and sends the corresponding commands to the engines – 160 times per second. The motors drive three little wheels that transmit the force to the ball.

“AT FIRST, we thought we’d try it with a simple basketball, but it quickly became obvious that it would bounce too much when the ballbot picks up speed.” On a less springy aluminum ball, the robot would have slipped. So they needed a ball that would not bounce too much and that had a surface that offered some friction. It also had to be light, no more than 2.5 kilograms, and perfectly round. The solution – a hollow aluminum ball with a soft-plastic coating – was not commercially available and had to be designed in cooperation with one of their sponsors. The rubbery coating allows the ballbot to move on various grounds, such as carpet, pavement or marble, and can be replaced when it’s worn. “At the moment, we have winter tires,” Péter jokes.



MAKE WAY FOR REZERO The ballbot is designed for high acceleration.

READY, SET, GO. The slippery race course presents no difficulties for the ballbot.

REZERO’S SECOND computer is responsible for translating external input into movement. Without it, the ballbot could balance but not move. At ZURICH.MINDS, Péter uses a Playstation joystick to direct where Rezero is going. “Of all the joysticks that we used, the Playstation one allows the finest control – maybe because we are used to it.” The ballbot can also run a predefined course. And, it can recognize people and follow them around, mirror their movements or rotate around them even if they are walking. Rezero follows or orbits people at a constant distance; when it stays close to them, but retracts when they move toward it, it resembles a puppy: nosy enough to follow, but too shy to get close.

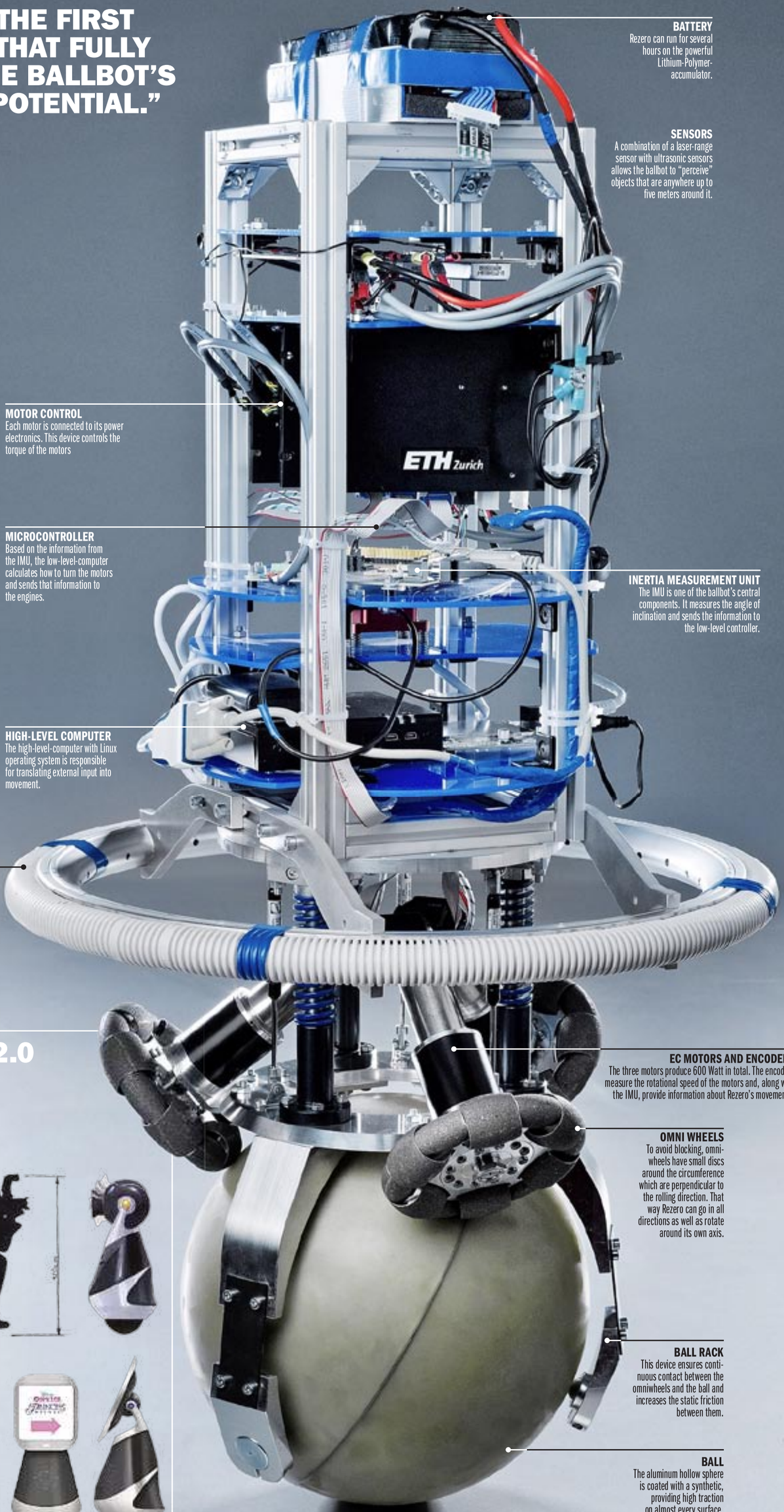
WITH THIS MOVEMENT, “Rezero simulates curiosity and playfulness,” the project paper states. It turns out that the developers were aiming for this organic, or non-technical, liveliness. A cover design was supposed to enhance that effect even further by emulating humans through small movements. “A lamellar cylinder would contract when the ballbot does a slalom course, for example, and it would look like a skier leaning into a curve. Or, it could move quickly up and down after a run to imitate heavy breathing.” Because of time constraints, they didn’t fully realize the design concept. Rezero does have a cover, which makes it vaguely resemble a handheld vacuum cleaner, but the cover is static.

HOWEVER, even without the original cover, the robot has personality. Its interaction with people makes it seem friendly, the ease of its movements make it seem proud and confident, even a little showy. “He is childish and playful,” says Péter. “He is a little provocative – when he moves swiftly toward people and away again. But then, even though he is so technical, he is actually quite cute.”

“SOME PEOPLE LIKE IT BETTER with the cover, because it simply looks more finished.” On the other hand, the cover partially hides the ball. That is why when the team demonstrates Rezero with cover, they need to explain much more than when it is bare and people can grasp the challenge intuitively. “People understand how difficult it is to balance on a ball. They just know if they tried it, they’d fall. And then they see this robot that is doing it in such a light-footed way.”

REZERO IS JUST A BALLBOT for the sake of a ballbot, “an ambassador of his unique movement potential” as the project paper says. But future variations could serve as mobile maps in theme parks, for example, and they could even take visitors directly where they need to go. Following a visitor around, it could also serve as a mobile camera. Or: “A dance show would be doable in the next few years,” Péter envisions. With the technology that is already in place, the ballbot could carry out a predesigned choreography with music. Human dancers and special effects would complement the show. “With the gliding movements, I can imagine that would work well. Of course, because it’s a robot on a ball, the choreography would have to focus on the ball.” When robots become dancers, engineers become choreographers.

“REZERO IS THE FIRST PROTOTYPE THAT FULLY REALIZES THE BALLBOT’S MOVEMENT POTENTIAL.”



BATTERY
Rezero can run for several hours on the powerful Lithium-Polymer-accumulator.

SENSORS
A combination of a laser-range sensor with ultrasonic sensors allows the ballbot to “perceive” objects that are anywhere up to five meters around it.

MOTOR CONTROL
Each motor is connected to its power electronics. This device controls the torque of the motors

MICROCONTROLLER
Based on the information from the IMU, the low-level-computer calculates how to turn the motors and sends that information to the engines.

INERTIA MEASUREMENT UNIT
The IMU is one of the ballbot’s central components. It measures the angle of inclination and sends the information to the low-level controller.

HIGH-LEVEL COMPUTER
The high-level-computer with Linux operating system is responsible for translating external input into movement.

TILT PROTECTION
The ballbot is designed not to topple over, but if it does, the ring protects the highly expensive components.

REZERO 2.0

EC MOTORS AND ENCODERS
The three motors produce 600 Watt in total. The encoders measure the rotational speed of the motors and, along with the IMU, provide information about Rezero’s movements.

OMNI WHEELS
To avoid blocking, omni-wheels have small discs around the circumference which are perpendicular to the rolling direction. That way Rezero can go in all directions as well as rotate around its own axis.

BALL RACK
This device ensures continuous contact between the omniwheels and the ball and increases the static friction between them.

BALL
The aluminum hollow sphere is coated with a synthetic, providing high traction on almost every surface.

WHAT’S NEXT
Will we see Photobots that follow us around, screenbots that serve as mobile advertising boards, signposts or runbots that you can ride in the near future?

PHOTO Geri Born

A TRUE RENAISSANCE PERSON

And a true ZURICH.MINDS person – **Prof. Greta Patzke** has a passion for her field and many others.

MANY TALENTS AND INTERESTS
"Not only was Greta a wunderkind on the flute, she has also digested the world's classic literature from Plato to Proust." (Rolf Dobelli)

COPY: **HAIKE SCHATTKA**
PHOTOS: **KARL-HEINZ HUG**

“IF SOMEONE ASKS ME WHAT I DO, I NEED TO BE ABLE TO EXPLAIN SUCCINCTLY WHAT I AM DOING, WHY I AM DOING IT AND WHAT SENSE IT MAKES FOR SOCIETY.”

A painting by Dalí, a quote from Snow White, an image of an Indian goddess – these references to art, literature and religion were unexpected accents in Professor Dr. Greta Patzke’s presentation about chirality at the ZURICH.MINDS flagship event in 2009. Because of the chemist’s diverse interests and broad knowledge, moderator Rolf Dobelli introduced her as a “true Renaissance person.”

“I BELIEVE YOU CAN AVOID SYSTEMATIC ERRORS BY STUDYING THE CLASSICAL AUTHORS VERY CLOSELY,” Greta says. “Among chemists, there is this old joke, that one hour in the library – or nowadays on the Internet – can save you 12 days in the laboratory. If you stay well-informed, you can avoid nonessential work.” She laughs, then adds: “I think that is also true about studying world literature and philosophy.”

GRETA TALKS quickly with an intonation that holds the listener’s attention. The emphases she places on individual words act like little magnets that subtly draw you toward her. Her voice is dark and pleasant. Even though her sentences are often long and branch out into subordinate clauses, her responses are well-worded, practically ready to publish – and she apologizes when they aren’t. Her grammar is impeccable to an extent that is rare even in print. She individualizes her vast vocabulary with archaic expressions as well as neologisms. As is common among German speakers who spend a lot of time in an international environment, she sometimes replaces German words or phrases with their English equivalents.

GRETA BEGAN her education in the humanities very early, reading the works of Greek philosophers, lyrics by German poets, and novels by American contemporary writers during her childhood and early teens. When she decided to study Chemistry at age 14, she had already thoroughly weighed the pros and cons of various other careers. She was gifted in music, but reading biographies made her realize that musicians, especially child prodigies, tend to burn out. In other sciences, she perceived, you need the typical “youthful spirit,” but, she felt, you could grow old in – and with – Chemistry. “If you keep expanding your portfolio, develop into a pleasant and experienced leader, inspire young people and remain flexible, there’s no reason to stop. That was clear to me early on.” Yet, her decision was not only the bare sum of those conscious reflections. She just knew what to do. “The decision came quite naturally,” she acknowledges. And that is why she has never had second thoughts. “Every life-shaping decision that you need to make using your head, you have not really made. It will still linger on.”

SHE REMAINED an avid reader, but passionately dedicated herself to her science. By her late teens, she participated in the International Chemistry Olympiad. She finished her chemistry studies and her Ph.D. in a mere six years and then went to ETH Zurich for her habilitation, moving her focus from crystal growth techniques to nanoscience. Since 2007, she has been professor at the University of Zurich where she benefits from generous funding by the Swiss National Science Foundation as well as the UZH itself. “It’s a great environment for research,” she says. “My group thoroughly enjoys the inspirational and interdisciplinary working atmosphere there.” Her young and international team of scientists at the Institute of Inorganic Chemistry researches a broad range of fields that border on various other disciplines from catalysis and sensor technology to life sciences.

NANOSCIENTISTS RESEARCH THE STRUCTURES and properties of smallest particles. These

INTO THE DEPTHS OF CRYSTAL STRUCTURES
Greta and coworkers at the x-ray powder diffractometer analyzing the structural features of nanomaterials.

PRECISION COUNTS
Typical operations in fabricating nanomaterials: getting the starting mixture right.

“YOU CAN AVOID SYSTEMATIC ERRORS BY STUDYING THE CLASSICAL AUTHORS VERY CLOSELY.”

“nanoparticles” have a size of 1 to 100 nanometers at least in one dimension. (For comparison: a sheet of paper is 100,000 nanometers thick.) They can consist of merely a few atoms or molecules, or of larger assemblies. They can have properties that are considerably different from larger particles of the same composition. Within Chemistry, nanoscience is a forefront field of research with manifold possible applications in various industries. Much is left to discover in this wide-open area and further breakthrough insights are to be expected.

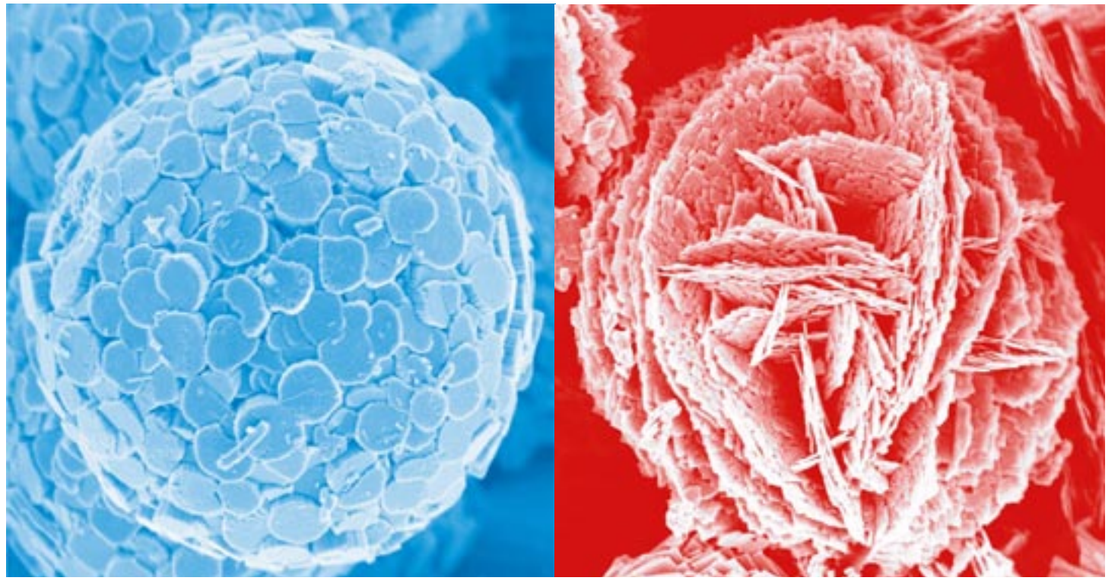
SCIENTISTS USING ELECTRON microscopes can visualize these tiny structures with images recorded at high magnifications. “Here you can see the striped pattern,” Greta points at the image of one such particle, a ball of slivers that resemble the fibrous slices of sugarcane. “Those are single nano fibres, with a diameter of 5 to 10 nanometers. These nano fibres assemble into cylinders and these cylinders self-organize with tantalizing regularity into these balls.” She chuckles.

“Nowadays analyzing these compounds with electron microscopy is standard practice. And because the compounds are so beautiful, it is better than watching TV, it’s better than the movies, it’s better than everything.” The enthusiasm with which she explains her field of research makes it clear that, at age 36, burnout is the furthest thing from Greta’s mind. “I have gotten tired of many things,” she says, “but the only thing that I simply cannot get enough of is Chemistry.”

SHE ENJOYS THE SOCIAL INTERACTION of her lab work and her discipline. She remains fascinated by the interdisciplinary nature of her area of research and appreciates the broad scope of topics that are open to her: “If you have a solid basic training in Chemistry and if you don’t allow people to coax you into specializing too early, you can do everything.” That goes for any given day: One day, she may spend hours delving into the structure of a crystal and discussing its geometrical properties; she may spend the next day researching and keeping up-to-date in the various other fields her research group explores, for example the quest for new bio-inorganic drugs.

SOMETIMES, GRETA FEELS like the embodiment of the ’90s advertising slogan, “Where do you want to go today?” She wants to be able to answer that question each day with one or two sentences imbued with deliberate intention. Even more so, she explains, “If someone on the street or any random person on a plane or in a café, asks me what I do, I need to be able to explain succinctly what I am doing, why I am doing it and what sense it makes for society.” She believes that exciting research is often fueled by problem-solving strategies for real-world challenges. “Society trusts young people. It invests an incredible amount of money in them – the education of a chemist is an expensive business,” she explains. “As a young person, you are well-advised to give back real value.”

AND INDEED, the scientists in Greta’s research group focus on solving pressing problems.



DIFFERENT APPEARANCES, BUT SIMILAR CRYSTALLIZATION STEPS «Our group has elucidated that spherical arrangements of different oxide particles follow the same growth pathways.»

“WATER SPLITTING WOULD REALLY BE A HUGE STEP TOWARD A PERFECTLY CLEAN GLOBAL ENERGY SUPPLY.”

One researcher synthesizes oxide nano materials and fabricates prototypes of miniature sensors of corrosive gases. A likely usage in the future: watches with little sensors that can measure ozone concentration or other airborne pollutants. Widespread use of sensors would enhance both the quality of life, especially in growing urban communities, and raise our environmental alertness toward invisible threats. Another research project focuses on waste water treatment. “We have more and more organic pollutants in the water that stem from increased consumption of pharmaceuticals, pesticides, etc.; those need to go.” And to vanquish those pollutants, Greta’s group is working on developing oxide particles that can function as catalysts under influence of visible light and can decompose such pollutants and transpose them into harmless matter. From early on, the researchers consider an invention’s commercial viability: Materials need to be cheap; particles must not be toxic and they must be easily producible.

HER NEXT NEW PROJECT is being lined up to her visible relish: “This is where I see my mission for the next years: tapping into the massive resources of solar energy for alternative sources of power. That would really be a huge step toward a perfectly clean global energy supply.” The idea is to split water into hydrogen and oxygen using nanocatalysts. The resulting hydrogen would be an energy carrier that could then be used in various ways. Such catalyst systems, based on oxide powders, already exist in principle, but their efficiency needs to be fundamentally enhanced for mass-scale technology. Currently teams are working worldwide on the development of suitable systems: “It is a huge interdisciplinary melting pot.” Some researchers calculate the structure of materials to predict their light absorption features, surface experts analyze whether a substance actually has the right surface to be able to catalyze the reaction, preparative chemists optimize the particle shape and composition, and finally engineers and process technicians will have to work on scaling the production. “The caravan is not in full gallop yet,” says Greta. “There are still many ways to get into it, and one should. All of these are problems that need to be solved in my generation, or the subsequent one at the latest.”

THE AIR IS GETTING THIN
Mini-reactor design for synthesizing oxoclusters in special atmosphere.

BUT SOLVING SUCH DILEMMAS is just tackling one end of the chain reaction. These problems are man-made and for society to survive, people have to change their lifestyles. For Greta, classic literature, religious tradition and intercultural exchange are means of focusing back on the essentials. “What we really need is not very much. What we really need is fresh air for breathing – hence the sensors; we need clean water for drinking – hence the waste water treatment; and we need some warmth in the winter – hence energy technology. And then we need human warmth, and if we put all our money on technology, we will lose that. So, the fine arts will meet essential non-material needs.”

Watch the video on:
http://zurichminds.com/videos/patzke.html

SEARCHING EYES
He is not interested in the gloss of things. His wish is to dig deeper and find what lies beneath the shallow surface.

WHISPERING ART

His output is scarce. Its content hard to digest. Meet ZURICH.MINDS member **Hans Danuser,** the man who redefined the art of photography.

“WE GREW UP WITH THE IDEA: PERHAPS SOMETHING VERY DIFFERENT IS POSSIBLE …”

COPY: **MICHAEL MERZ**
PHOTOS: **KARL-HEINZ HUG**

An apartment block in Zurich dating from the first half of the 19th century. The upper floors are rented flats, one of which is occupied by Hans Danuser and his family. On the ground floor he also has a studio. The rooms are double height but otherwise not very spacious. The walls are roughly plastered, and the furniture is modest and functional. Scaffolding is used to store the archive and various materials. On a simple table are emulsion samples used by Danuser to create the photographs he uses in his work. Against one wall there is a somewhat rickety-looking garden table together with a few equally rickety-looking garden chairs. This is where guests – and journalists – sit. Reduction seems to be Hans Danuser’s motto and a guiding principle in his daily routine as an artist.

HE IS A TALL MAN with wild hair and an unkempt beard. His eyes have an inquiring, searching quality. His posture is guarded. When he walks, his pace is strangely slow. Lengthy strides, seeking out the right place for each foot to land, like mountaineers do. He speaks in the measured tones of someone from the canton of Graubünden, from Chur to be precise. That is what one gleans from his biography, but he does not like to talk about his background, at least not very much. However, when asked how one should picture the young Hans Danuser – in his youth in the 1950s and 60s, out there in the sticks, then he proffers a few nuggets of information, such as: “I had a very sheltered upbringing.” He mentions a “house with grounds”, then drops the expression “good childhood friends” into the conversation, before sketching out another aspect of his youth: “At the same time, this period had an intellectual background …” He says little about his time at a grammar school in Chur. Then his need to communicate evaporates, and the look of caution returns to his eyes.

A MUSICAL SCORE OF WORDS Counting-out rhymes are rhythmized with the help of especially defined typefaces and refined colors.

ANOTHER TACK. The journalist throws a teaser at the artist: “So, would it be fair to describe your family as being cultivated and bourgeois?” After a long pause Danuser replies drily, “One could say that.” Surprisingly, and before his questioner has a chance to delve deeper into the topic just touched upon, Danuser shifts the conversation to his school years in the late 60s. “The post-’68 generation, which I belong to, is incredibly privileged. We benefitted from a trail that our colleagues had prepared a few years earlier. We grew up with the idea: Perhaps something very different is possible …”

THAT “SOMETHING VERY DIFFERENT” was the big city of Zurich down in the lowlands. “I went there fast”, he says, but adds: “I spent a long time looking. I could say two or three things relating to this time, but one thing was particularly important: I no longer wanted to learn about what others had thought earlier!” The somewhat perplexed expression on the journalist’s face that this remark elicited was what probably prompted Hans Danuser to elucidate: “A few art students were here in my studio recently. They were also asking about how things started, to which my reply was: The most important thing was that I spent three or four years trying to forget everything that I had learned previously!”

IT’S QUIET. Danuser’s hands – beautiful, slender, man’s hands – are folded. “Perhaps it is a privilege to be allowed to forget. That is maybe why I said earlier that I had a privileged upbringing. I had the chance to be allowed to forget – as opposed to someone who never had the chance to learn something in the first place.” This is followed by another of those pauses in which Hans Danuser seems to be struggling for words. Then he adds: “Art, in the next step in my development, gave me the possibility to do that.”

HANS DANUSER BECAME a photographer’s assistant, but at a time when photography was yet to be recognized as one of the classical arts. “Admittedly, there had been fine art photographers around for as long as photography itself”, he says. He goes on to make an observation about the significance of photojournalism in the 1950s. By that time the field had acquired a certain authority, but was not yet recognized as an artistic medium in its own right. “I found that incredibly exciting. It was like … an open field. Nothing was defined. The quality parameters had not yet been established.”

“YOU MEAN LIKE the white spaces on old maps of the world?”, suggests the journalist. “It really was something like the time when Livingstone set off for Africa. Wonderful.” Danuser then looks the journalist directly in the eyes. “You should probably strike what I’ll say next from the record … because it will come across as somewhat coquettish: I chose this art form because its parameters had not yet been set, because at that time it still wasn’t valued …” Hans Danuser looks down at his hands and becomes silent, and then adds, “But it was exactly that point which was so crucial for me.”

GUARDED POSTURE
Not easy to talk to nor easy to get answers on all those questions Hans Danuser’s Art puts into the mind of the onlooker of his works.

SO, THE YOUNG DANUSER works as an assistant. His mentor is a marvellous commercial photographer. “It was a period in which advertising was truly innovative. It was a world of exploration. It had nothing to do with what was being taught at art schools at the time. I wanted, therefore, to go into advertising. I wanted to work with this particular photographer. And I struggled to get there.” And yet Hans Danuser would not be who he is today if he had been content with this initial schooling in creativity. In the late 1970s he resolved to embark on a new departure as an artist. It was to be a ten-year exploration through the world of photographic art. “Let’s put it this way: between 1980 and 1989 photography became for me something like home. During this period I found and occupied ‘my’ white space on the territory of this art.”

“IT WAS the investigation of a role?”

“IT IS’, REPLIES HANS DANUSER, “like taking a glass full of liquid in your hands. You hold the glass and …” His hands mimic the form of the glass in the air, while he searches for the right words. “… and you look at the glass as if you were looking at it for the first time.”

“YOU ENTER into a dialogue with a mute object? And this reflects your thoughts?”

“THOUGHTS ALWAYS manifest themselves via things and sentences. Otherwise they’d remain prisoners in our heads.”

THE FIRST TIME. Three dry words that represent a meaningful statement in the work of Hans Danuser. He starts off by addressing an extremely difficult topic, his engagement with which, over the ensuing years, results in the photographic art series “In Vivo”. The images are reflections on the end of life: what remains when our bodies end up in the anatomy or pathology department.

“IT’S A TOUGH MATTER. An eccentric subject. A cynical person might say that the young Danuser wanted to make his mark. But one could also say that he was looking for something that he could see anew. Or that he wanted to reveal something one normally never sees?!”

“WHAT CAN I SAY to that? Perhaps it was really like that. But these were also harsh images in a harsh time. Do you remember? The Cold War. My other series also deal with this: my project about gold – the gold trade that was conducted between Switzerland and South Africa at the time, or my Los Alamos project in the secret atomic research facility in the desert of New Mexico.”

“BUT THE IN VIVO project reveals for the first time not only your being hard on yourself,

CONTINUED: **28**

“THE VIEWER OF MY EROSION PROJECT WALKED BETWEEN THE PHOTOGRAPHS.”

CREATIVE SPACE
Hans Danuser’s office might not be the biggest loft the world has seen. But for his kind of creative output, it has just the right size.

FINGERWORKS
The finished counting-out rhymes do not show the hard work Hans Danuser puts into them, to create such a light and airy kind of art-work.

“I CHOSE THIS ART FORM BECAUSE ITS PARAMETERS HAD NOT YET BEEN SET …”

but also being hard towards others. You show things that we generally turn away from.”

“THAT IS EXACTLY the point that interested me. To find the level at which one looks. Maybe one blinks before one looks. That’s just how it was with me. But then … a slow process of convergence starts to occur. It’s like looking through the crack of a door … If I can make this process visible in my work, then I’m content.”

“DON’T these images return to you in your dreams?”

“YOU CAN ONLY DO this work if you give yourself enough time. And the human figure never actually appears in the photographs. One senses its presence in the background. However, the human being as an object of research is at the core of these works. They are workplace situations.”

“BUT IT MUST HAVE fascinated you, because years later you did another project that involved dead people.”

“YOU’RE TALKING about the photographs of victims of violence?”

“YES, WHERE THE SIGNS of strangulation were photographed in such a sophisticated manner that the image itself becomes an object of tremendous aesthetic appeal. Those who don’t want to see don’t see. Or they don’t see the violence; they see the aesthetic, the form, the structure. Was this escape? Was it the knowledge that the subject of your photographs can only be digested by the viewer if presented in this form?”

“THE ANSWERS OVERLAP. When I exhibited the pictures for the first time, at the Kunsthaus Zurich, the large-format photographs were displayed behind glass. So the people looking at these physically very powerful photographs were themselves reflected in the glass. Their own bodily presence thus entered into the images.”

“YOU BECOME part of it?”

“EXACTLY. For precisely the same reason, when I did my Erosion project I laid a series of photographs of eroded soil on the floor of the exhibition hall. The viewer walked between the photographs and thereby perceived them in completely different ways.”

“ART as dialogue?”

“ART in direct dialogue.”

“TO WHAT EXTENT are you playing with experience when you take on projects that are so large and costly – in terms of both time and materials?”

“LIKE ANYONE ELSE, I bring experience to my work. And yet it is very clear in each of my four major work series that I have started from zero.”

“YOU REALLY HAVE forgotten everything you knew before?”

DEPARTURE POINT
Choosing the right kind of photographic paper is not the thing of a whim, but the result of a long winding road of trial and error.

“IT’S LIKE LOOKING THROUGH THE CRACK OF A DOOR … IF I CAN MAKE THIS PROCESS VISIBLE IN MY WORK, THEN I’M CONTENT.”

TEST SERIES It's not the picture alone that puts the mind of the onlooker into action. It's even the color of the photo paper that pulls the right trigger in the mind of the visitor to Hans Danuser's world of art.

"IT IS VERY CLEAR: IN EACH OF MY FOUR MAJOR WORK SERIES I HAVE STARTED FROM ZERO."

"I WENT AHEAD in this way, because that's exactly how I work. I've never simply continued doing something because it was successful. I've always started from scratch."

"WHICH BRINGS US to your latest venture. Something completely unlike any of your previous projects."

"YOU'RE TALKING about the counting-out rhymes."

"THIS ISN'T AN ART of horror or fear, but rather an art with – if one dares use the word at all in this context – charm. How did you arrive at this point?"

"CHANCE. You see children. See how they play and understand things: They still choose the cops and robbers for their games in the same way we used to – by using counting-out rhymes. And another element of chance struck me when working on my Frozen Embryos project: I was struck by the incredible number of so-called papers that are produced. Papers in which science attempts to find a reason for why a decision is taken one way or the other."

"WOULD YOU PREFER it then if science dealt with its decision-making by means of counting-out rhymes? If counting-out rhymes were recited by members of the board at bank meetings? If the judgments of politicians were guided by counting-out rhymes?"

"MAYBE I would prefer that one doesn't have to translate art so directly into practical life. On the other hand, the system of counting-out rhymes reveals an incredible phenomenon. Whichever way the decision goes, it is accepted. It is transparent. I was talking about this to Andrew Barber, a professor of mathematics; and I recited one of these counting-out verses. And what did he say? 'It sounds like an algorithm. They are creating random generators in order to use them for decision-making.'"

"IT IS maybe better if we go back to discussing the way you depict counting-out rhymes …"

"WITH PLEASURE. Because the sound of these rhymes – their structure – can be converted into an image, almost like a score, one can place the sound on the wall, as it were."

"ONE SEES the image and it starts a dialogue …?"

"EXACTLY. If the viewer decides to get involved in the process. Another thing: Art, my counting-out rhymes art, is ephemeral rather than lasting. These aren't pictures that one can hang on the wall. I apply the counting-out rhymes directly onto the architecture. All over it – something like a frieze in a room that is particularly suitable for the purpose. When the exhibition is over, everything is covered with white paint. My art is like a whisper. It's gone already."

WRITINGS ON A WALL Hans Danuser makes an exit at Zurich's Uni Irchel by passing his own artwork, commissioned by the town of Zurich.

ZURICH.MINDS Foundation

A REAL COMMUNITY

Forget **Networking** and start Understanding.

COPY: **ROLF DOBELLI**
PHOTOS: **GERI BORN**

The world hosts enough global VIP conferences to fill an entire year's calendar. Many of them are pure networking events with shallow content, monstrous gatherings set up to cater to a global business network. We are different. We banned the word "networking". We focus on insights. We love real hard thinking and real hard discussing, especially in fields that are new to us. And we are a real community where people meet in fellowship outside of our planned events.

ZURICH.MINDS meets once a year for its main flagship event. This event gathers all of our members together in one place. And they flock in from everywhere, Switzerland, of course, Germany, the US, Israel, UK, Sweden. The presentations are deliberately eclectic – you hear from brain surgeons, artists, biologists, CEOs, astronomers – a wild mix that stimulates your brain. It's like drinking from a fire hose. Between flagship events, ZURICH.MINDS hosts several DEEP DIVE events. They are smaller in size and focus on one particular subject – we go deep instead of wide.

ULTIMATELY, we hope to increase the quality of our decisions. ZURICH.MINDS is about mind-deals, not business-deals. If any members of our community have questions, we can go straight to the source: The people who know have become people we know. What a privilege!

THOMAS LADNER
Business lawyer, partner at Exigen Capital
Member of the Board

HANS-JÜRG RUFENER
Founder of Rufener Events
Member of the Board

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PUTTING OUR LIVES INTO PERSPECTIVE

Astrophysicist and ZURICH.MINDS member **Prof. Ben Moore** creates marvelous simulations and offers gloomy predictions.

THE MASTER OF THE UNIVERSE
Astrophysicist Ben Moore in front of a projection of the Orion Nebula in the planetarium of the Swiss Museum of Transport in Lucerne.

COPY: **HAIKE SCHATTKA**
PHOTOS: **KARL-HEINZ HUG**

In the next 18 minutes, I want to put your lives in perspective!" No wonder Ben Moore was a bit breathless at the second ZURICH.MINDS flagship event on Nov. 24, 2008. In his fast-paced, 20-minute presentation, he chased his audience through 28 billion years of time – the past, the present and the future of the universe.

PROFESSOR DR. BEN MOORE, 44, is an astrophysicist and director of the University of Zurich's Institute for Theoretical Physics. He and his team of researchers literally have their head in the clouds as they probe such questions as: How do stars form? Or planets? Or galaxies? Where did the universe come from? How did it evolve? And where is it headed?

BEN'S TEAM feeds its computers visual data, the "initial conditions" and a set of complex equations – describing how gravity acts, how space expands, how particles move, and the like – to create simulations of the evolution of matter, the collision of galaxies, the forming of new cosmic structures. The videos have a curious beauty: points of warm light fleeing from a center toward the viewer and outside the frame like fireworks; golden insects revolving around a light source; a dance of feathers. They'd merit watching even without further explanation. Ben's descriptions add a sense of the sublime to the experience, that sense of awe – and smallness – that you feel when you look at the ocean or the Alps.

"IT'S NICE to make the output of your research as visually attractive as possible," Ben says enthusiastically. "We can compress the whole history of the universe into a 30-second movie. If you watch something like that on a screen, it is easier to comprehend what is going on."

IMAGES FROM OBSERVATORIES provide the visual inspiration for Ben's simulations. One example is the Hubble Deep Field, the longest-exposure photograph of the universe ever taken. "When you look at the picture," he explains, "you see tens of thousands of young galaxies, so far away that we are seeing them as they were over ten billion years ago. So you can build a historical record of how the universe evolved because you can look back in time." That is how scientists know, for example, that the structure of the universe was once very

ROCK GUITARIST "PROFESSOR MOORE"
An unexpected collaboration to result from ZURICH.MINDS: the electronic band milk67, founded by Martin Hellweg and Aaron von Schroeder, partnered with rock guitarist "Professor Moore" to create a new crossover style electro rock album.

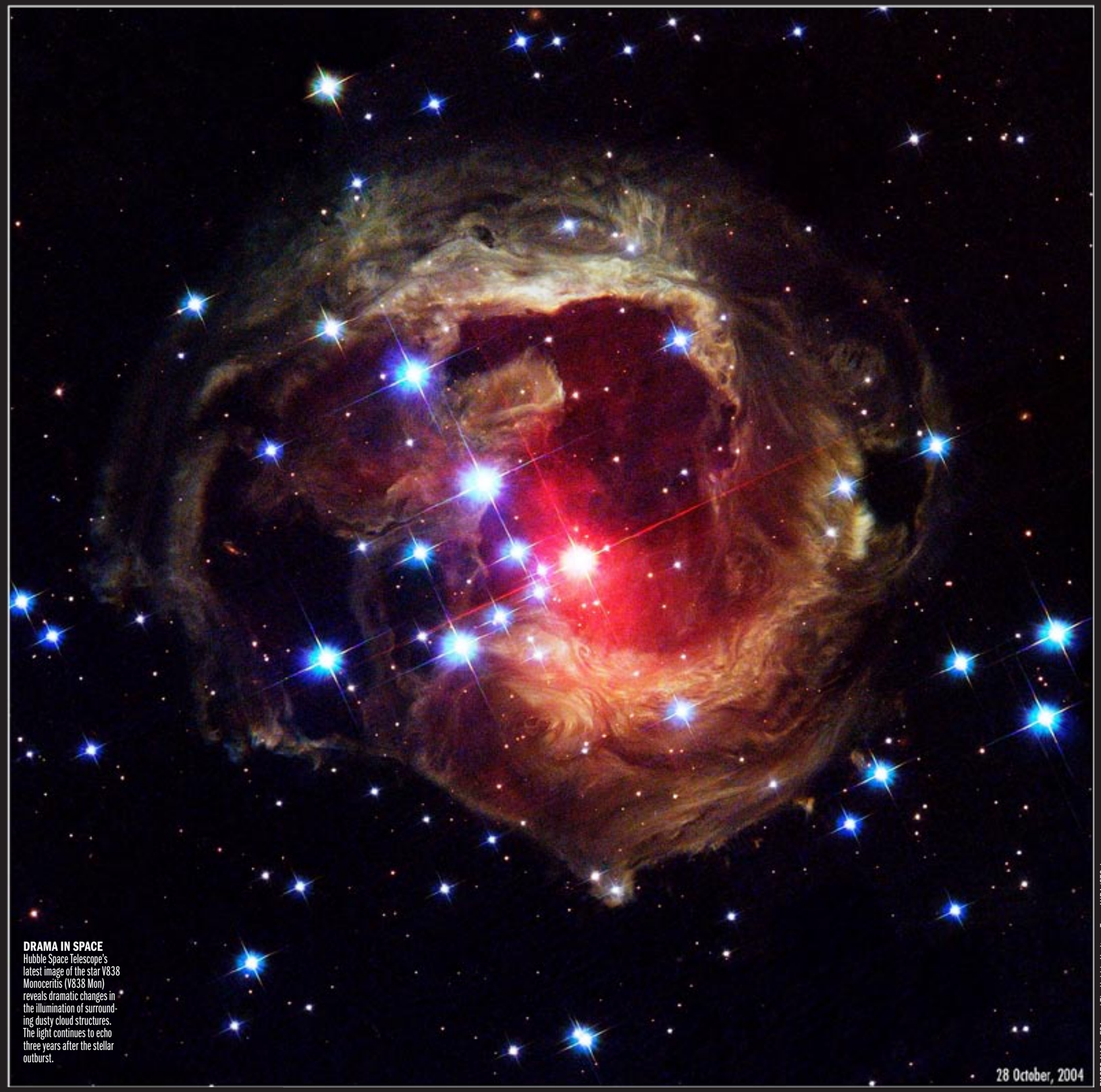
"I TRY TO BE CREATIVE IN DIFFERENT WAYS."

THE CURIOUS BEAUTY OF THE EVOLUTION OF MATTER, THE COLLISION OF GALAXIES, THE FORMING OF NEW COSMIC STRUCTURE.

smooth, like the surface of a calm ocean with tiny ripples. Ben can use this information for the initial conditions of his simulations.

TO PERFORM HIS SIMULATIONS, Ben needed a powerful computer. When he took over the chair that Albert Einstein once held at the University of Zurich, he did not have sufficient funds to buy a commercial computer with the capacity he needed, one with the processing power close to that of a human brain. "The first person I hired was one of the smartest people I knew," Ben says. That would be Dr. Joachim Stadel, his colleague and friend from the University of Washington at Seattle. For Stadel's job interview, the men went to El Lokal, an alternative bar with a wooden interior cluttered with pop art, a chandelier – and a skeleton – hanging from the ceiling. In this environment, Stadel outlined not only his ideas for research, but also the design of a powerful supercomputer, consisting of 288 regular central processing units (CPUs) linked by a high-speed network. Ben drew up Stadel's contract on one napkin, and they completed the design for the supercomputer on another.

THEY GAVE THEIR CONCEPT to the university's workshop who built a custom frame, and the crew put together all of the components. One month later, Ben, Stadel and their Ph.D. students assembled in a small room at the university. "We switched on the 50,000 Watts of power, and all the little twinkling lights came on. That was a good sign, but we still had to inject the parallel operating system to bring the system alive. It was a wonderful moment when it all actually worked." At the time, the one cubic-meter, one-ton supercomputer was



DRAMA IN SPACE
Hubble Space Telescope's latest image of the star V838 Monoceritis (V838 Mon) reveals dramatic changes in the illumination of surrounding dusty cloud structures. The light continues to echo three years after the stellar outburst.

PHOTO NASA, ESA, and The Hubble Heritage Team AURA/STScI

“CONSIDER THAT ON THIS TIMESCALE, HUMANS HAVE ONLY BEEN ON THIS PLANET FOR FOUR SECONDS.”

the fastest computer in Switzerland. Today, it is still in place. They have upgraded the components three times; now, it is about 100 times faster than when it was first built.

A SPECTACULAR VIDEO that looks like two melding clouds of smoke, for example, took one month of supercomputer time. It shows the foreseeable collision of our galaxy with the Andromeda galaxy, metaphorically set for “tomorrow at 2 a.m.” To make the time scale more comprehensible, Ben transferred the universe’s entire history into the course of one day: 13.7 billion years ago, at midnight, the universe formed during the big bang. By 10 a.m., our galaxy had mainly formed, although our sun and solar system didn’t appear until 4:22 p.m. The first complex living organisms arrived at around 7 p.m., dinosaurs showed up at 11.35 p.m. and became extinct at 11.52 p.m. “Consider that on this timescale, humans have only been on this planet for four seconds.” Ben emphasizes the last two words.

“IT’S MY JOB TO TELL PEOPLE about my research on a level that they can understand. If you understand something and understand it well, then you can explain it to anybody.” In fact, being able to spell out complex matters was one of the original drivers that sent Ben into physics. His father, a forester who never went to university, nonetheless had a scientific curiosity: “Why is the sky blue? What is quantum mechanics? How did the universe form? He was fascinated in nature and by physical phenomena which he didn’t really understand at a deep level.” Ben took it upon himself to find out and he would go home to explain what he had learned to his father. “We’d just sit and chat about some of the things I could answer. Although now it’s over 15 years since I received my Ph.D., it still amazes me both how much we have learned about our universe, but also how much more there is still left to learn.”

“HOW DID THE UNIVERSE FORM?” “It still amazes me,” says Ben Moore, “how much we have learned, but also how much there is still left to learn.”

DURING A CONVERSATION AT HIS HOME in Zurich Irchel, Ben’s pace is less urgent. Without time restraints and with dimmed atmospheric lights instead of a lectern and a spotlight, he talks more slowly. His hands, gesticulating during the presentation, rest on his legs. He explains his excursions into the depths of physics as well as the details of his research in digestible portions and a comprehensible format. Ben is writing a layman’s science book that will be published next year. Beyond his wish to popularize physics to attract talented students and faculty to the university, he enjoys the public’s interest in his field: “We try to answer questions that people often think about, questions that puzzle them. The media regularly publishes news on astronomical discoveries, because people are interested!”

A STAR IS BORN Like a dark creature from a Harry-Potter-like fairy tale, a column of cold gas and dust rises from a stellar nursery called the Eagle Nebula. The tower is 9.5 light-years or about 90 trillion kilometers high.

PHOTO NASA, ESA, and The Hubble Heritage Team STScI/AURA

“AND YET,” HE SAYS MATTER-OF-FACTLY, “our research may have little short-term value to the human race. If I tell you how our galaxy forms, it is not going to change your income or the general well-being of your family.” In the long run, on a timescale of several hundred years, research in astrophysics and other sciences might enable humans to travel to other stars, to inhabit other planets when life on Earth is no longer sustainable. And in the short run? “It makes you want to enjoy every minute of life, making the most of your limited time on this small rocky planet. It’s really all you have in this universe: it was an incredibly unlikely event for your brain to form and become conscious. Time is relentless and evolution seems to be successful because individuals die, together with all their thoughts and memories.”

“OUR GALAXY MIGHT STILL avoid the 2 a.m. collision with the Andromeda galaxy shown on the video. The universe is expanding at a faster and faster rate; the acceleration of the expansion of space will cause all the galaxies to move beyond our horizon, disappearing out of sight for future astronomers and avoiding further cosmic collisions between galaxies. Depending on the exact nature of Einsteins “cosmological constant,” which describes the mysterious negative pressure that “space” is observed to have, the forces might become stronger than gravity in our galaxy. The moon would then move beyond the horizon, the force of the vacuum could even become stronger than the electromagnetic forces, breaking up molecules and, eventually, shredding the Earth into dust.

“AND ALL OF THIS COULD happen as soon as the day after tomorrow. Just the age of our universe again,” Ben said as he wrapped up his ZURICH.MINDS presentation. “I hope that puts your lives into perspective a little bit and makes your temporary worries of losing a few billions on the stock market seem quite small and irrelevant. I urge you to live for the moment.”

Watch the video on: **http://zurichminds.com/videos/ben_moore.html**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